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By: _____

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

K. MARKHOFF	
SERIAL NO.: 10/067,499	
	Examiner: S. KENNY
FILED: 2/6/02	Art Unit: 3726
FOR: PARTIAL OR COMPLETE UTILIZATION OF A PRESSURIZED-GAS CYLINDER KNOWN PER SE FOR COMPRESSED, LIQUEFIED OR DISSOLVED GASES	

Hon. Commissioner of Patents
and Trademarks
P. O. Box 1450
Alexandria, VA 22313-1450

BRIEF ON APPEAL

Sir:

This is an appeal of the Final Rejection dated December 31, 2003.

1. REAL PARTY IN INTEREST

The real party in interest is Messer Griesheim GmbH.

2. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

3. **STATUS OF ALL CLAIMS**

Claims 12-18 and 20-23 are pending in the application. All of these claims were finally rejected and are the subject of this appeal.

4. **STATUS OF AMENDMENTS**

There were no amendments filed after the final rejection.

5. **SUMMARY OF THE INVENTION**

The present invention relates to a process for producing a composite pressurized gas cylinder for compressed liquid or dissolved gases. (Page 1, lines 5-7) In the prior art pressurized-gas containers are pressurized-gas cylinders for compressed, liquified or dissolved gases having a maximum filling pressure up to 300 bar. However, users are demanding pressurized-gas containers having a maximum filling pressure up to 300 bar. (Page 2, lines 1-5)

In accordance with the invention a composite cylinder comprises a liner which is wrapped over a substantial part of its length with composite fibers. A significant feature of the invention is that the liner itself is a pressurized-gas cylinder. (Page 3, lines 2-6) By using a pre-existing, preformed, second-hand gas cylinder as the liner production costs can be decreased by

approximately 1/3. In addition, instead of disposing of a second-hand cylinder the cylinder is reused as a liner thereby saving resources and reducing emissions since fewer pressurized gas cylinders have to be produced. (Page 3, lines 13-24)

Although the liner, when previously used as a gas cylinder, was capable of having a filling pressure of 150 to 200 bar, the final cylinder which uses the second-hand cylinder as its liner can have a filling pressure of 300 bar or greater. (Page 3, lines 18-20; Page 4, lines 1-5; and Page 4, line 22 to Page 5, line 3) The final cylinder which uses the second-hand cylinder as its liner may have a bursting pressure of approximately 600 bar with the bursting pressure of the unwrapped liner being equal to or greater than 85% of the test pressure of the wrapped composite cylinder. (Page 5, lines 3-7)

6. **ISSUES**

The issues are:

Whether claims 18 and 20-23 are unpatentable under 35 USC § 102(b) as being anticipated by Windecker U.S. Patent No. 4,835,975;

Whether claim 12 is unpatentable under 35 USC § 103(a) as obvious over Windecker in view of Hext U.S. Patent No. 4,486,938; and

Whether claims 13-17 are unpatentable under 35 USC §103(a) as being obvious over Windecker in view of Applicant's Admitted Prior Art (AAPA).

7. GROUPING OF CLAIMS

Appealed claims 12-18 and 20-23 are set forth in the attached appendix.

Claims 12-13, 15, 17-18 and 21 may be grouped together and thus stand or fall together.

Claims 14 and 16 may be grouped together and thus stand or fall together.

Claims 20 and 23 may be grouped together and thus stand or fall together.

Claim 22 is grouped alone.

8. ARGUMENT

A. THE REFERENCES

1. U.S. Patent No. 4,835,975 ("Windecker")

Windecker is the basic reference in all of the rejections. In relying upon Windecker the Examiner states that "Windecker discloses a process for producing a composite gas cylinder for a higher filling pressure comprising obtaining a pre-existing second-hand cylinder (column 2, lines 3-12 wherein the pre-stressed liner

serves as a "second-hand cylinder") for compressed, liquefied or dissolved gases, with a lower filling pressure, and wrapping composite fibers over the pre-existing cylinder to convert the pre-existing cylinder into an inner liner and thereby form the composite gas cylinder from the inner liner and the outer composite fiber wrapping".

The portion of Windecker being relied upon by the Examiner is actually in the background of the invention in Windecker. In any event, as will later be discussed, this portion of Windecker simply relates to liners per se, but not to pre-existing, preformed, second-hand pressurized gas cylinders used as liners.

2. U.S. Patent No. 4,486,938 ("Hext")

Hext relates to a process for remanufacturing drilling fluid pump cylinder liners. Hext was relied upon as a secondary reference with regard to dependent Claim 12 which added features relating to techniques for reducing the wall thickness of the liner.

3. Applicant's Admitted Prior Art ("AAPA")

The admission referred to by the Examiner is in the Background of the Invention of this application pointing out that the usual pressurized gas containers have a maximum filling pressure up to 200 bar and that users are demanding containers having a maximum filling pressure up to 300 bar.

B. THE INVENTION

The key feature of the invention is in the use of a pre-existing, preformed, second-hand, pressurized gas cylinder as a liner for producing a composite gas cylinder. (Page 3, lines 13-24) This is accomplished by starting with a cylinder which had been previously used, but instead of discarding the cylinder, the cylinder is wrapped with composite fibers over a substantial length so that the pre-existing cylinder is converted into an inner liner for a composite gas cylinder. (Page 3, lines 2-5) Among the advantages of the invention are that products (i.e., used cylinders) which would have been discarded find new life as a liner. This results in cost reduction and in environmental benefits. (Page 3, lines 20-24) In addition, by providing the composite wrapping around the used cylinder, a liner which had been used at a filling pressure of 150 bar to 200 bar becomes part of a composite cylinder having a higher filling pressure of about 300 bar. (Page 3, lines 18-20; Page 4, lines 1-5) The composite cylinder which uses such liner has a pressure resistance wherein most, such as at least 85% of the pressure resistance is achieved from the liner. (Page 5, lines 5-7)

C. Claims 12-13, 15, 17-18 and 21

Of this group of claims, Claim 21 is the parent claim. The remaining claims are dependent directly or indirectly on Claim 21.

As set forth in Claim 21 the process for producing a composite gas cylinder comprises "obtaining a pre-existing, preformed and pressurized gas cylinder" which had a lower filling pressure and then wrapping composite fibers over a substantial length of the pre-existing gas cylinder to convert the pre-existing gas cylinder into an inner liner and thereby form a composite gas cylinder from the inner liner and the outer composite fiber wrapping.

Parent Claim 21 and various dependent claims were rejected under 35 USC § 102(b) as anticipated by Windecker. Specifically, the Examiner referred to the disclosure at col. 2, lines 3-12 as the sole portion of Windecker being relied upon to anticipate Claim 21. It is submitted, however, that this interpretation of Windecker as an anticipatory reference is wrong in a number of respects.

At the outset it is noted that col. 2, lines 3-12 refers to a discussion of the prior art practices in the Windecker patent. That discussion must be taken in its context. In that regard, attention is directed to the disclosure which begins in col. 1, line 58 with respect to the prior art practices indicating that "Normally aluminum was used as the liner material to reduce weight...aluminum liners tend to contract more than the winding material, causing the liner to separate from the windings". In the portion of Windecker relied upon by the Examiner, Windecker points out to how that problem of the liner separating from the windings was addressed in the prior art. Namely, "some workers in the art accounted for this problem with aluminum inner liners by first prestressing the aluminum liner until it de-

formed plastically, then winding the aluminum liner with the filament windings. Then as the pressure vessel was cooled to cryogenic temperatures, the filament windings and the inner liner contracted with the inner liner in compression and the windings in tension to keep the inner liner in contact with the windings." What is disclosed in this portion of Windecker is the prior art recognition of a problem with liners for pressure vessels regarding the tendency of the liner to separate from the windings. The prior art addressed this problem by modifying the liner to prestress the liner and then wind it with filament windings. Accordingly, what is disclosed is how a liner was modified by the prior art to become an improved liner. Nowhere in this disclosure is there any recognition, suggestion or teaching that the liner before being wrapped with filament windings itself function as a "pre-existing, preformed second-hand pressurized gas cylinder" as stated in parent Claim 21. All that is disclosed is that one form of liner could be replaced by a different form of liner, but the aluminum liner was firstly and lastly still a liner. There is no disclosure of the liner having been in itself a pre-existing pressurized gas cylinder. Based upon what is disclosed in Windecker, the liner itself could have been merely part of a pressurized gas cylinder as confirmed by the Windecker discussion (Col. 3, lines 65-67; col. 4, lines 23-24) of the Windecker invention wherein there are more layers to the cylinder than simply a (1) liner and (2) filament windings. Specifically Windecker discloses (1) windings 12 wrapped around (2) the liner with (3) a foam insulation layer covering the windings.

The reliance upon Windecker is also misplaced when viewing the disclosure of Windecker with regard to where the purported teaching is in the Windecker patent that is relied upon by the Examiner. As noted, the "teaching" actually relates to prior art practices. The Windecker invention, however, is directed to different practices wherein a multi-layer cryogenic tank is formed from a plurality of layers including inner liner 10, filament windings 12 and a thick layer of polyurethane foam insulation 14. Attention is directed to the disclosure in Windecker at col. 1, line 58 to col. 2, line 11 which describes what the invention or teaching of Windecker is, namely, a cryogenic tank which is a cryogenic pressure vessel that would be filled with liquid gas. Such tanks are not used as gas cylinders in the manner of this invention. The problems addressed by Windecker do not relate to gas cylinders and clearly do not suggest incorporating a second-hand cylinder as a liner. Usually, metal tanks are cryogenically unstable because the metal gets brittle when cooled to low temperatures. In this status the tanks may burst when pressurized. This danger would be reduced by mechanical pretreatment of "new" tanks. Windecker thus addresses another problem, namely, liner and winding separation when cooled. This problem is managed by pretreating or prestressing the new liner. Accordingly, in Windecker the treatment of the liner to produce a prestressed liner is merely one step in a process of forming a new liner from new material and has nothing to do with using a pre-existing pressurized gas cylinder with

a lower filling pressure as a liner for a composite gas cylinder for a higher filling pressure as is the subject of parent Claim 21.

Moreover, there would be no motivation to one of ordinary skill in the art when reading the Windecker disclosure to resort to the prior art practices from which the Windecker invention differs to again return to those practices and modify them in complete disregard to the fact that these are teachings which Windecker does not adopt, but rather Windecker uses other techniques to improve upon those practices.

Clearly, there is no teaching in Windecker of the process of parent Claim 21 which utilizes a pre-existing gas cylinder, one having a life unto itself and then converting that gas cylinder into a liner for a composite gas cylinder for a higher filling pressure. Accordingly parent Claim 21 and its dependent claims should be allowed.

D. Claims 14 and 16

Claim 14 is dependent on Claim 13 which is indirectly dependent on Claim 21. Claim 16 is dependent on Claim 15 which is directly dependent on Claim 21. Claims 14 and 16 relate to the feature of the improvement in the composite gas cylinder as compared to the pre-existing gas cylinder which is used as its liner. Specifically, the pre-existing cylinder was used at a filling pressure of 150 bar to 200 bar (parent Claims 13 and 15), while the composite gas cylinder has a "higher filling pressure [which] is about 300 bar".

Claims 14 and 16 had been rejected as unpatentable over Windecker in view of AAPA. AAPA was relied upon with respect to the statement that the usual pre-existing gas cylinder had a filling pressure of about 150 bar to 200 bar and that there was a demand for a gas cylinder having a maximum filling pressure up to 300 bar. While these statements regarding the two different filling pressures are made in the present application discussing the background of the invention, these statements do not provide what is missing in Windecker, namely, that a pre-existing gas cylinder could be used as a liner for a composite gas cylinder. Moreover, the statement in the Background of the Invention of this invention simply refers to different filling pressures for different pressurized gas cylinders. There is no suggestion that by using a gas cylinder having a lower filling pressure as a liner for a composite gas cylinder which when wrapping composite fibers around the liner would render the composite cylinder capable of having a higher filling pressure.

E. Claims 20 and 23

Claim 20 is dependent directly on Claim 21, while Claim 23 is dependent indirectly on Claim 21. Claim 20 specifies that "most of the pressure resistance of the composite cylinder is from the liner". Claim 23 states that "at least 85% of the pressure resistance is from the liner". Claims 20 and 23 had

been rejected under 35 USC § 102(b) as anticipated by Windecker. In making this rejection the Examiner took the position that "Windecker discloses at least 85% of the pressure resistance is from the liner (Column 2, lines 5-6) wherein all the pressure resistance or 100%, is provided by the liner since the composite windings are not yet applied." This portion of Windecker, however, simply states that in the prior art workers first pre-stressed the aluminum liner until it deformed plastically. No statement is made as to any correlation between the pressure resistance contributed by the liner when it is part of a composite cylinder. Accordingly, Windecker does not anticipate what is added to their parent claims by Claims 20 and 23.

F. Claim 22

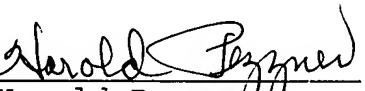
Claim 22 adds to parent Claim 1 that "the liner had been previously used as a pressurized gas cylinder containing compressed, liquefied or dissolved gases". Claim 22 had been rejected under 35 USC § 102(b) as anticipated by Windecker. Claim 22 is included in a separate grouping from parent Claim 21 to emphasize the feature of the liner having been "previously used". Although it is believed that this feature has been adequately defined in parent Claim 21, Claim 22 is presented as a separate group in view of the position taken by the Examiner in the Advisory Action of March 11, 2004, with regard to (in effect)

the liner of Windecker being capable of having been a pre-existing or preformed or second-hand gas cylinder. For the reasons submitted above with regard to Claim 21, however, Windecker does not anticipate nor render obvious Claim 22.

9. CONCLUSION

In view of the above the Examiner should be reversed in his rejections.

Respectfully Submitted,
CONNOLLY BOVE LODGE & HUTZ LLP

BY: 

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APPENDIX

Claims on Appeal:

12. A process according to claim 21, characterized in applying a treatment selected from the group consisting of surface treating and machining to a substantial part of the length of the pre-existing cylinder to reduce its wall thickness.

13. A process according to claim 12, characterized in that the pre-existing cylinder was previously used at a filling pressure of 150 bar to 200 bar.

14. A process according to claim 13, characterized in that the higher filling pressure is about 300 bar.

15. A process according to claim 21, characterized in that the pre-existing cylinder was previously used at a filling pressure of 150 bar to 200 bar.

16. A process according to claim 15, characterized in that the higher filling pressure is about 300 bar.

17. A process according to claim 21, characterized in that the higher filling pressure is about 300 bar.

18. A process according to claim 21, characterized in that the liner is a seamless metal liner which is vacuum tight.

20. A process according to claim 21, characterized in that most of the pressure resistance of the composite cylinder is from the liner.

21. A process for producing a composite gas cylinder for a higher filling pressure comprising obtaining a pre-existing preformed second-hand pressurized gas cylinder for compressed, liquefied or dissolved gases, with a lower filling pressure, and wrapping composite fibers over a substantial length of the pre-existing gas cylinder to convert the pre-existing cylinder into an inner liner and to thereby form the composite gas cylinder from the inner liner and the outer composite fiber wrapping.

22. A process according to claim 21, characterized in that the liner had been previously used as a pressurized gas cylinder containing compressed, liquefied or dissolved gases.

23. A process according to claim 21 wherein at least 85% of the pressure resistance is from the liner.

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